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# Free Flight or Free Fall

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# FREE FLIGHT OR FREE FALL?

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IN 1995, outdated equipment at several U.S. air traffic control centers has faltered at least one dozen times.[1] While no major incidents resulted, the equipment failures highlighted many problems facing aviation in the United States today.

For example, the suspect equipment is outdated—the oldest equipment still uses vacuum tubes and has been in use since World War II.[2] Not only is the technology outdated, but many claim the system of air traffic management currently employed by the Federal Aviation Administration (FAA) is highly inefficient. As one pilot stated, the inefficiency of the system is "literally strangling the aviation industry," despite ample unused airspace and runway capacity.[3]

Further, as the system falters, demand for carrier services is increasing. Within the next ten years, air traffic in the United States is expected to increase dramatically by sixty percent, to 800 million passengers per year.[4] Everyone from pilots and controllers to FAA administrators seems to agree: the nation's system of air traffic management needs help.[5]

In an historic move, the industry, including commercial airlines and general aviation, has come to the Federal Aviation Administration for new services and benefits rather than programs.[6] As the industry struggles,[7] the FAA has recognized the need for more efficient services to meet increasing demand.[8] It is no surprise, then, that the idea that planes may be

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[1] J. Lynn Lunsford, *FAA Plan May Extend Pilot Control; But Routing Proposal Raises Safety Question*, DALLAS MORNING NEWS, Sept. 24, 1995, at 1A, 30A.

[2] Eric Malnic, *FAA Plans to Put Air Traffic Control on New Flight Path*, L.A. TIMES, Sept. 18, 1995, at A1.

[3] William B. Cotton, Captain, *Free Flight in Domestic ATM*, J. AIR TRAFFIC CONTROL, Jan.-Mar. 1995, at 10.

[4] Lunsford, *supra* note 1, at 30A.

[5] Malnic, *supra* note 2, at A1. Michael Goldfarb, former FAA Chief of Staff, has stated there is a 30-40% inefficient use of air space. *News: 10:31 p.m. ET* (CNN television broadcast, Mar. 29, 1996) (transcript no. 1315-5) (interview with Michael Goldfarb).

[6] Bruce D. Nordwall, *"Cultural" Shift Key to New Concept*, AVIATION WK. & SPACE TECH., July 31, 1995, at 40.

[7] As of August 1993, the airline industry was $35 billion in debt. *U.S. Panel Recommends Tax, Regulatory Relief*, DAILY TAX REP. (BNA) No. 160, at G-1, G-2 (Aug. 20, 1993) (discussion of the tax and regulatory relief suggested in 1993 by the National Commission to Ensure a Strong Competitive Airline Industry); *see also* Planzer & Jenny, *infra* note 191, at 18.

[8] Perry Bradley, *Free Flight*, BUS. & COM. AVIATION, June 1995, at 90.

able to fly faster, more direct routes while burning less fuel has turned more than a few heads.[9]

The idea is called Free Flight. This Comment offers an introduction to the ideas surrounding free flight and several issues involved with its implementation. Part I provides an introduction to the present system of air traffic control and its problems. The details of free flight, its components, and its benefits are discussed in Part II. Finally, Part III looks at concerns regarding free flight, potential liability problems, and unanswered questions.

## I. THE CURRENT SYSTEM

### A. THE NATIONAL AIRSPACE SYSTEM

The system employed by the Federal Aviation Administration today is possibly the safest air traffic management system in the world.[10] There are serious doubts, however, as to its efficiency. Until recently, these doubts have not been addressed because the system is "unfailingly safe," and accidents such as midair collisions are so unlikely to occur that the FAA has resisted any major overhaul.[11]

The last significant changes to air traffic control in the United States occurred in the 1980s, when the FAA determined the safest approach to managing the high volume of air traffic in the United States involved tight control of air traffic by confining planes to designated, well-defined airways.[12] This system, the National Airspace System, revolves around "preferred routing," which allows for controlled ordering and separation of aircraft.[13]

Under the National Airspace System, all movement by air traffic is carefully monitored and structured.[14] Carriers, through

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[9] William J. McGee, *Getting There Faster and Cheaper; The National Route Program*, AIR TRANSPORT WORLD, Sept. 1995, at 46.

[10] *News: 8:30 a.m. ET* (CNN television broadcast, Aug. 10, 1995) (transcript no. 130-10) (interview with Monte Belger, associate administrator for air traffic services for the FAA) [hereinafter CNN Broadcast].

[11] *Free-for-All in the Skies*, FORTUNE, May 29, 1995, at 22.

[12] *Hearing on Free Flight: FAA Stymied by High-Tech Advances Before the Subcomm. on Employment, Housing, and Aviation of the House Comm. on Government Operations*, 103d Cong., 1st Sess. 31 (1994) (prepared testimony of William F. Jeffers, associate administrator for air traffic, FAA).

[13] *Id.*

[14] Mike Ball et al., *Is Free Flight Feasible? Results From Initial Simulations*, J. AIR TRAFFIC CONTROL, Jan.-Mar. 1995, at 14.

the pilot or an air carrier dispatch office, are directed to follow a preferred flight route.[15] By assigning preferred routes, air traffic controllers are able to maintain a consistent and ordered structure in the skies and at airports, which makes it easier for the system to continue separation standards and therefore safe and, in theory, efficient operations.[16] Planes today are often separated by 1000 feet vertically, and by five miles horizontally.[17]

On any flight, pilots must follow the strict routes designated by air traffic control, checking with, and being monitored by, controllers along the way.[18] The air traffic controllers on the ground actually have the last word on every aspect of a plane's flight, such as when the plane takes off, at what altitude it flies, what speed the plane travels, if and when turns are made, and when and from what direction to land.[19]

The system basically performs two functions, as explained to the U.S. House of Representatives Committee on Government Operations: (1) separation of aircraft, and (2) traffic flow management, or ordering aircraft in a landing sequence the airport can accommodate.[20] At some airports, aircraft are lined up as far away as 500 miles from the flight's destination in order to prevent "traffic jams" caused by too many planes converging on the airport at once.[21]

### B. Problems and Complaints

The current system is not without its critics. The main complaint is that the system, although safe, is terribly inefficient.[22] Air traffic control inefficiency is blamed on the inflexibility and rigid separation standards inherent in the system.[23] The Air Transport Association has claimed this discourages industry

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[15] *Id.*

[16] *Id.*

[17] Lunsford, *supra* note 1, at 1A.

[18] Alfonso Chardy, *Future of Air Travel May Ride on "Free Flight"; Pilots to Determine Routes, Altitudes, Speeds*, PHOENIX GAZETTE, Sept. 21, 1995, at A16.

[19] *Id.*

[20] *Hearing on Free Flight: FAA Stymied by High Tech Advances Before the Subcomm. on Employment, Housing, and Aviation of the House Comm. on Government Operations*, 103d Cong., 1st Sess. 31 (1994) (prepared testimony of Captain William B. Cotton, manager, air traffic and flight systems, United Airlines) [hereinafter Cotton testimony].

[21] Lunsford, *supra* note 1, at 30A.

[22] *Free-for-All in the Skies*, *supra* note 11, at 22.

[23] *Industry Says Free Flight Technology Could Save Airlines Billions a Year*, DAILY REP. FOR EXECUTIVES, Aug. 10, 1994, at 152.

growth, and if air traffic continues to be managed under the current system, it will run out of capacity to handle growing demand.[24] As noted above, air traffic is expected to increase by sixty percent, to 800 million passengers per year, by 2005.[25]

One problem leading to the system's inefficiency is the outdated equipment currently in use. The radar units employed by the National Airspace System are "expensive to build, expensive to maintain, expensive to fix, and expensive to protect from the weather," and the range can be blocked by buildings, mountains, or other obstacles.[26] Reportedly, many of the computers in the system are so outdated they still use vacuum tubes.[27] Replacement parts are hard to come by and, on occasion, have only been found in the Czech Republic and Poland.[28]

Congress recently heard testimony comparing air traffic control equipment in use in the United States with that of other nations.[29] One example stated that the tiny nation of Fiji has one of the most up-to-date systems, which use personal computers.[30] These computers incorporate and display data transmissions from airborne data processors, then calculate the aircraft's exact location with the help of signals from Global Positioning System (GPS) satellites.[31] In comparison, the United States system seems to restrict air traffic rather than use available technology to expand airspace capacity and improve safety for National Airspace System users.[32]

In fact, the Federal Aviation Administration has had trouble developing and implementing modernization programs.[33] These programs have stalled and have been discarded many times in recent decades.[34] In the meantime, nations such as Great Britain and Germany have purchased and installed air

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[24] *Id.*

[25] *See supra* text accompanying note 4.

[26] Malnic, *supra* note 2, at A1.

[27] Peter J. Howe, *Outdated Air Traffic System Awaits Overhaul*, BOSTON GLOBE, Oct. 14, 1995, at 1.

[28] *Id.*

[29] *See Federal Aviation Administration Revitalization Act of 1995: Hearings on H.R. 2276 Before the Subcomm. on Aviation of the House Comm. on Transportation and Infrastructure*, 104th Cong., 1st Sess. 31 (1995) (statement of James K. Coyne, President, National Air Transportation Association) [hereinafter Coyne testimony].

[30] *Id.*

[31] *Id.*

[32] *Id.*

[33] Malnic, *supra* note 2, at A1.

[34] *Id.*

traffic control equipment more sophisticated than that in use in the National Airspace System.[35] Often, such equipment was developed in the United States, indicating that the technology is readily available.[36]

But the system itself, not just the technology, is out of date. Although safe, the National Airspace System is incapable of absorbing projected demand.[37] "The delays, congestion, and inconvenience resulting from this are obvious, well documented, and are experienced by millions of consumers each year."[38] There are also unseen impacts such as slowed economic growth, unemployment, decreased productivity, and increased pollution from excess flying.[39]

By following preferred air traffic control routes instead of direct routes, planes use extra fuel.[40] Established routes are overcrowded, using more fuel and causing delays.[41] Also, because planes adhering to the paths cannot fly straight to their destinations, planes must fly single file for the duration of a flight, often stuck between slower planes for thousands of miles.[42] One critic compared this to a "Corvette behind an 18-wheeler in a no-passing zone."[43]

In the end, the function of separating aircraft has been overcome by the process of lining up aircraft for arrival.[44] In extreme instances, critics suggest, "aircraft bound for New York are literally getting in line while still flying over the Pacific Northwest."[45] This process of sequencing planes for arrival at airports is a particular problem at busy "hub" airports, as con-

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[35] *Id.*

[36] *See id.*

[37] *Hearing on Free Flight: FAA Stymied by High-Tech Advances Before the Subcomm. on Employment, Housing, and Aviation of the House Comm. on Government Operations*, 103d Cong., 1st Sess. 31 (1994) (prepared statement of Captain R. Michael Baiada, RMB Associates; Michael J. Boyd, president, Aviation Systems Research Corp.; and Norman W. Wafts).

[38] *Id.*

[39] *Id.*

[40] Malnic, *supra* note 2, at A1.

[41] *Id.*

[42] *Morning Edition: Airlines Call for More Efficient Use of Airspace* (NPR radio broadcast, Aug. 22, 1995) [hereinafter NPR Broadcast].

[43] Chardy, *supra* note 18, at A16.

[44] Cotton testimony, *supra* note 20.

[45] *Id.*

trollers often sequence flights at slow, gas-guzzling speeds before allowing them to land.[46]

As the critics' complaints grow louder, the FAA has begun to move toward changing the system. This change is motivated by lost profits in the industry.[47] Restricted to established paths between slower planes, waiting in line to take off and land, and circling airports, airlines are losing money.[48] Resulting delays correlate to missed connections and related costs, such as rebooking passengers on other flights, overtime pay for employees, and extra maintenance.[49]

The cost of these inefficiencies depends on the individual air carriers,[50] but most costs are in the form of burned fuel.[51] Because many of its flights are not allowed to take the most direct, efficient route, United Airlines has estimated the airline's revenues are cut by approximately $1 billion a year.[52] The airline further estimates the cost of flying at inefficient altitudes, waiting at airports, and circling runways costs the airline $670 million annually.[53] Air traffic managers at American Airlines believe that on some routes, American Airlines planes fly twenty percent farther than necessary.[54]

## II. THE COMPONENTS OF FREE FLIGHT

Out of these criticisms has grown the idea of "free flight." This concept was born from the idea that significant improvements to the air traffic control system can be made.[55] Simply, free flight will allow pilots (and airlines) to fly "when they want to and where they want to."[56]

Free flight is not a new concept. Some involved with the development of free flight claim the idea has been around for

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[46] WALL ST. J. REP., *FAA May Let Airlines Set Own Flight Paths*, TAMPA TRIB., Aug. 8, 1995, at 1.

[47] Chardy, *supra* note 18, at A16.

[48] *Id.*

[49] *See* Bill Sweetman, *Accelerating the ATC Revolution; Air Traffic Control*, AIR TRANSPORT WORLD, May 1995, at 57; Chardy, *supra* note 18, at A16.

[50] *See Industry Says Free Flight Technology Could Save Airlines Billions a Year*, *supra* note 23.

[51] Chardy, *supra* note 18, at A16.

[52] *Free-for-All in the Skies*, *supra* note 11, at 22.

[53] *FAA May Let Airlines Set Own Flight Paths*, *supra* note 46, at 1.

[54] *Free-for-All in the Skies*, *supra* note 11, at 22.

[55] CNN Broadcast, *supra* note 10.

[56] *Id.*

years, but has only now caught on.[57] The real impetus for change occurred when United Airlines captain R. Michael Baiada and Denver-based aviation consultant Michael Boyd authored a highly critical report on the current air traffic control system, which inspired congressional hearings in August 1994.[58] Specifically, the hearing addressed complaints that the FAA was dragging its heels in improving the current system of air traffic control, and that attention was not properly focused on issues of air traffic management.[59]

Since the congressional hearing, free flight has made significant and rapid advances. Specifically, the Federal Aviation Administration has expanded and accelerated what is now the National Route Program (NRP), and has developed a plan to adapt the National Airspace System for free flight.[60]

To further the study of free flight, in October 1994, a twenty-three member committee was formed through the Radio Technical Commission for Aeronautics (RTCA), a non-profit company charged by the government and aviation industry "to develop navigation, control and communications standards."[61] FAA officials and representatives from the airlines, pilots' and controllers' unions, general aviation, civilian contractors, and the Department of Defense comprised the committee members.[62] To the surprise of many, this committee quickly produced a concise, unanimous directive for free flight,[63] complete with specific recommendations.[64] This thirty-five page white paper was presented to former FAA Director David Hinson in January 1995.[65]

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[57] *See* Cotton, *supra* note 3, at 10.

[58] Sweetman, *supra* note 49, at 57; *see generally Hearing on Free Flight: FAA Stymied by High-Tech Advances Before the Subcomm. on Employment, Housing, and Aviation of the House Comm. on Government Operations*, 103d Cong., 1st Sess. 31 (1994).

[59] *Hearing on Free Flight: FAA Stymied by High-Tech Advances Before the Subcomm. on Employment, Housing, and Aviation of the House Comm. on Government Operations*, 103d Cong., 1st Sess. 31 (1994) (prepared testimony of J. Roger Fleming, senior vice president, operations and services, Air Transport Association of America) [hereinafter Fleming testimony].

[60] Sweetman, *supra* note 49, at 57.

[61] *Id.*; *see also* Bradley, *supra* note 8, at 90.

[62] Bradley, *supra* note 8, at 90; Sweetman, *supra* note 49, at 57.

[63] RTCA, INC., REPORT OF THE RTCA BOARD OF DIRECTORS' SELECT COMMITTEE ON FREE FLIGHT (1995) (available from RTCA, Inc., 1140 Connecticut Ave., N.W., Suite 1020, Washington, D.C. 20036-4001, telephone: (202)833-9339, facsimile: (202)833-9434) [hereinafter RTCA COMMITTEE REPORT].

[64] Sweetman, *supra* note 49, at 57.

[65] Bradley, *supra* note 8, at 90.

The FAA endorsed the suggestions of the RTCA committee and an executive committee, RTCA Task Force 3, formed at the request of Hinson in April 1995.[66] Hinson specifically asked the task force to provide an implementation strategy identifying expected user benefits, outlining changes in procedures, and recommending appropriate technology.[67]

Task Force 3 submitted the results of its study of free flight to Hinson in October 1995.[68] The Final Report provides a detailed, technical free flight implementation plan with recommendations for the near-term (through 1997), mid-term (1998 through 2000), and far-term (2001 and beyond).[69]

One publication reported that Hinson called the task force report "first-class."[70] Tony Broderick, FAA Associate Administrator for Regulation and Certification, said, "We agree in principle with the recommendations."[71]

### A. Free Flight Defined

What is Free Flight?[72] The RTCA defines free flight as:

> A safe and efficient flight operating capability under instrument flight rules (IFR) in which the operators have the freedom to select their path and speed in real time. Air traffic restrictions are only imposed to ensure separation, to preclude exceeding airport capacity, to prevent unauthorized flight through special use airspace, and to ensure safety of flight. Restrictions are limited in extent and duration to correct the identified problem. Any activity which removes restrictions represents a move toward free flight.[73]

Task Force 3 expanded this definition to explain free flight as a concept encompassing the complete range of operation so that the benefits of free flight extend to ground movement and preflight activities.[74] The definition of free flight promulgated by

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[66] Sweetman, *supra* note 49, at 57.

[67] RTCA, Inc., Final Report of RTCA Task Force 3: Free Flight Implementation (1995) (available from RTCA, Inc., 1140 Connecticut Ave., N.W., Suite 1020, Washington, D.C. 20036-4001, telephone: (202) 833-9339, facsimile: (202) 833-9434)) [hereinafter Task Force 3 Final Report].

[68] *See generally id.*

[69] *Id.*

[70] *Industry Task Force Report Is "First Class"*, Air Safety Wk., Jan. 1, 1996, at 1.

[71] *Id.*

[72] For a succinct introduction to free flight, see *Free Flight Introduction* (visited Sept. 22, 1996) <http://asd.orlab.faa.gov/files/freeflgtintro.htm>.

[73] RTCA Committee Report, *supra* note 63, at 3.

[74] Task Force 3 Final Report, *supra* note 67, at 19.

the task force includes: "free flowing, improvements in concepts and operations to plan and maintain flight predictability; free filing, improvements in concepts and operations of flight planning; and, free flying, improvements in concepts and operations of flight maneuvering."[75]

The basic idea of free flight, however, means the pilot or carrier dispatcher will be able to pick the route, speed, and altitude at which they want to fly, although still notifying air traffic control of their intentions.[76] The only instance where air traffic controllers will interfere with a pilot's flexibility will be when: (1) a plane's operation may interfere with another aircraft's operations; (2) traffic at airports or congested airspace prevents the safe use of free flight; (3) an aircraft will fly into special use airspace; and (4) safety of flight restrictions are deemed necessary by controllers.[77] The RTCA also foresees instances where the pilot, not air traffic controllers, will take on separation assurance.[78] The task force report makes clear, however, that the air traffic service provider (air traffic control) "is always the ruling entity in separation arbitration."[79]

### B. Protected and Alert Zones

Free flight is built around the idea of two zones of airspace, protected and alert.[80] The size of each zone is dependant on the aircraft's size, speed, characteristics, and equipment.[81] The smaller zone is the protected zone. Under free flight, the protected zones of aircraft must never touch, let alone overlap.[82] The size of an aircraft's protected zone is a direct reflection of the accuracy of its position determination.[83] The alert zone extends beyond the protected zone and is used to indicate a potential situation where intervention may be necessary.[84]

The size of a plane's alert zone is based on "look ahead time," and the alert zone is the set of all potential protected zones of

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[75] *Id.*

[76] *Id.* at 1.

[77] RTCA Committee Report, *supra* note 63, at 7.

[78] *Id.*

[79] Task Force 3 Final Report, *supra* note 67, at 25.

[80] RTCA Committee Report, *supra* note 63, at 7. For a visual description of protected and alert zones in airborne free flight, see *Free Flight Visual* (visited Sept. 22, 1996) <http://asd.orlab.faa.gov/files/visual.htm>.

[81] RTCA Committee Report, *supra* note 63, at 8.

[82] *Id.*

[83] Task Force 3 Final Report, *supra* note 67, at 29.

[84] RTCA Committee Report, *supra* note 63, at 8.

the aircraft at that look ahead time.[85] The task force's report defines look ahead time as "a comfortable—not minimal—budget that allows for worse-than average human and systemic responses," and may vary with the air traffic when a plane is in flight.[86]

When an aircraft's alert zone is clear of the alert zone of other aircraft, that plane is free to maneuver at will.[87] If an aircraft makes any change in course, altitude, or speed, that information is sent via data link (a network of ground, air, and airborne communications systems) to the air traffic management system for planning purposes.[88] If alert zones come in contact, the air traffic management system will assess the situation and offer advisories or instructions as needed.[89]

The task force identified one conceptual problem with this system: if look ahead times are measured in minutes, and planes are allowed to maneuver at will, then each aircraft's alert zone has the potential to be very large.[90] As a result, there may be a considerable number of alerts. One solution offered by the task force is to establish "rules of the road" whereby some limitations may be placed on the maneuverability of aircraft until the end state of free flight is accomplished.[91] In the meantime, planes will be required to transmit their intent at a specified rate, while maneuvering planes may be required to transmit such intent at a higher rate.[92] Planes lacking instantaneous transmission capabilities will not be permitted to free fly.[93]

The minimum separation requirements in this concept are dependent on the equipment of the aircraft.[94] In such an instance, the concept of protected and alert zones will be adjusted mathematically for the particular aircraft's capabilities.[95] In any

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85 TASK FORCE 3 FINAL REPORT, *supra* note 67, at 30.

86 *Id.*

87 RTCA COMMITTEE REPORT, *supra* note 63, at 8.

88 TASK FORCE 3 FINAL REPORT, *supra* note 67, at 30.

89 *Id.*

90 *Id.*

91 *Id.* at 31.

92 *Id.*

93 *Id.*

94 *Id.* at 30; *see also* Bruce D. Nordwall, *Free Flight: ATC Model for the Next 50 Years*, AVIATION WK. & SPACE TECH., July 31, 1995, at 38, 39 ("[a] factor in the size of both zones will be the aircraft's communication, navigation, and surveillance equipment").

95 TASK FORCE 3 FINAL REPORT, *supra* note 67, at 30.

event, the human factors associated with aircraft separation need to be addressed.[96]

### C. AIRCRAFT-AIRCRAFT SEPARATION STANDARDS

In the present system, aircraft are separated from each other by as much as 1000 feet vertically and five miles horizontally.[97] Reducing these separation standards to provide for more efficient use of the National Airspace was one of the primary goals discussed by the RTCA Select Committee.[98] Task Force 3 also discussed reduction of separation standards as critical to the implementation of free flight.[99] The significance of reducing separation standards is that more aircraft will be able to use the same amount of airspace, and there will be a reduced number of alert zone conflicts, thus reducing restrictions on aircraft maneuverability.[100]

The task force Final Report explained the result of reduction in separation standards by discussing informal studies done for the RTCA task force.[101] The example provided in the task force's report assumes the current standards are reduced to three nautical miles horizontally and 1000 feet vertically (3 nmi/1000 ft.). The studies demonstrated "that given the same population and routes of flight, this reduction engenders a decrease in the number of aircraft to aircraft conflicts to about 1/3 the current number."[102]

One problem with these studies is that the increased workload on air traffic controllers by more compressed air traffic is not reflected.[103] The task force makes clear that separation standards will not be reduced so as to compromise safety, nor will the overall stress and workload of controllers be increased unreasonably.[104]

The ultimate goal of the RTCA task force is to reduce separation standards between aircraft to one nautical mile horizontally and 1000 feet vertically.[105] The same studies suggested a de-

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96 *Id.*
97 Lunsford, *supra* note 1, at 1A.
98 *See generally* RTCA COMMITTEE REPORT, *supra* note 63.
99 TASK FORCE 3 FINAL REPORT, *supra* note 67, at 34.
100 *Id.*; *see* discussion *supra* part II.B.
101 *See* TASK FORCE 3 FINAL REPORT, *supra* note 67, at 34-35.
102 *Id.* at 35.
103 *Id.*
104 *Id.*
105 *Id.*

crease in conflicts to one-ninth the current number with this standard, provided the reductions are safely made.[106] The risk of such reductions and the cost of new equipment to enable such separation reductions must be balanced, however, against the benefit of such reductions.[107]

### D. Special Use Airspace

One challenge facing free flight is restrictions on Special Use Airspace (SUA). Special Use Airspace is explained as "airspace that has been set aside for the principal use of the military for aircraft and other airborne operations (such as missile testing)."[108] When Special Use Airspace is not in use for its intended purpose, it is "released" during certain times for use by civil aviation.[109]

The necessity of such designated airspace is legitimate. Military aircraft often do not fly directly from one point to another, but in unpredictable flight paths at high speeds.[110] Also, such operations and missile testing could seriously endanger civil aircraft in the area.[111] As a consequence, civil aviation is routed around SUAs.

Task Force 3 also addressed the issue of Special Use Airspace and its impact on free flight. The task force emphasized the benefits of increasing access to SUA, such as "more flexibility in planning and operating flights to meet specific objectives of airspace users."[112] The task force's suggestions include the cooperation of the FAA and the Department of Defense, as well as airspace users, to determine how SUAs may be better used by civil aviation when not in use by the military.[113]

The primary problem with limited use of Special Use Airspace now is that civil aviation often does not know when SUA is available for their use.[114] Currently, such information is not communicated to those who need the information to make flight plans,

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106 *Id.*

107 *Id.* at 36.

108 Damon C. Hart, *Free Flight and Special Use Airspace,* Avionics Mag., Sept. 1995, at 20.

109 *Id.*

110 *See id.*

111 *Id.*

112 Task Force 3 Final Report, *supra* note 67, at 36.

113 *Id.*

114 Hart, *supra* note 108, at 20.

specifically air traffic controllers and pilots.[115] The task force recommends a real-time notification system between the Department of Defense and the FAA and, finally, between the FAA and pilots.[116]

### E. Other Aspects of Aviation

Task Force 3 sees free flight "as a broad concept extending throughout the en route and terminal airspace that permits maximum flexibility consistent with safety and assured separation."[117] It is therefore important that adequate procedures and equipment are implemented so that the benefits of free flight are not lost in delays around airports and on the ground.[118]

#### *1. Pre-Flight Planning*

Simply, flight planning is an estimation of a plane's performance under anticipated conditions.[119] In a free flight system, conflicts could arise if proposed flight plans are hindered or conflict. The RTCA task force recommends developing procedures and equipment to provide feedback to flight planners prior to departure.[120] Feedback needed by flight planners includes "potential impacts of requested flight plans, changes to requested flight plans, and systems constraints causing those changes."[121]

The task force suggests that the process of planning a flight begins hours before the flight actually departs. As departure time approaches, planning proceeds with increasing detail. Such details include: alternate plans if the original flight plan is rejected, other airports to divert to in an emergency, the flight's relationship to other flights, maintenance considerations, airport restrictions, and weather conditions at both arrival and departure airports as well as conditions along the route.[122] Because planning a flight involves so many different considera-

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115 *Id.*

116 Task Force 3 Final Report, *supra* note 67, at 36.

117 *Id.* at 37.

118 *Id.*

119 *Id.* at 41.

120 *Id.*

121 *Id.*

122 *Id.* at 42.

tions as well as people (air traffic control and others), the task force suggests flight planning

> [S]hould be thought of as the collection of three processes: a) Operations planning—the activities that affect the operation of the overall flight schedule; b) Mission planning—those things considered in the total operating plan for an individual flight; c) [User Preferred Trajectory] selection—the actual aircraft performance calculation given the anticipated weather.[123]

### 2. *Collaborative Decision-Making*

Task Force 3 is also concerned with the exchange of information between airspace users and the FAA allowing for users to be involved in the decision process.[124] The task force believes solutions to proposals will then be more agreeable to everyone involved.

In the Final Report, Task Force 3 suggests that improved telecommunications should be made available "to enhance the free flow of information between users and the Traffic Flow Management system."[125] In this way, system users will be able to better plan their operations and reduce traffic problems. The task force recommends that the FAA provide users with such information as in-flight flight progress, airport configurations, SUA utilization, and arrival slot times.[126] Examples of the kind of information users should provide to the FAA include accurate flight data such as flight plan updates, user priorities, and user responses on how to meet system constraints.[127]

### 3. *Controlled Time of Arrival*

It is assumed there must be some authority that can restrict resources when they become, or could become, overloaded.[128] The RTCA task force sees the Air Traffic Control System Command Center as the logical choice, and should cooperate with local air traffic management.[129] Where there is a constrained

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123 *Id.*

124 *See id.*

125 *Id.* at 43.

126 *Id.*

127 *Id.*

128 *Id.* at 44. Presently, the usual method for resolving airport constraints is for the control center to implement a ground delay program, which, the Task Force has determined, needs to be more flexible. *Id.*

129 *Id.*

airport, pilots and controllers have many resources that should be included in deciding how to handle the problem.[130]

One example the task force provides is in the case of weather problems, and the task force believes airline meteorologists should be a component in determining the potential severity or duration of problems.[131] This would then be used by air traffic management to determine appropriate rates of arrival and how long those rates should last.[132]

Task Force 3 has suggested two ways to accomplish its goal of addressing constraints within the system while providing more flexibility to system users.[133] The airspace user must be involved in the planning process and then may be able to use their resources to help solve the problem.[134] Also, airspace users can be assigned specific percentages of arrival slots per period of time—for example, fifteen minutes.[135]

### 4. *Handling Uncertainty in Arrival Rates*

Despite careful planning, there will be instances where FAA decisions will not mirror the user's intentions. For instance, the FAA may decide the rate at which a plane may arrive at an airport and how long that arrival rate must last. These rates may conflict, however, with the user's intentions. The task force recognizes that the system must be designed to allow the user's operational objectives to still be met.[136]

To reach the desired flexibility, certain airports have implemented the Managed Arrival Reservoir program which removes unnecessary restrictions into the airport.[137] Task Force 3 believes that if this type of program were expanded to all airports, a significant portion of the desired flexibility may be obtained.[138]

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130 *Id.*
131 *Id.*
132 *Id.*
133 *Id.*
134 *Id.*
135 *Id.*
136 *Id.*
137 *Id.* at 45.
138 *Id.*

*5. Terminal and Approach*

Terminal areas contain departure, arrival, and tower low level operations, creating a high "dynamic density."[139] Such terminal areas use radar surveillance and published standard routes for transition to and from the en route structure.[140] Controller directed routes are used to separate over-flying traffic and traffic operating off published routes, and to establish arrival sequencing and spacing.[141] Inherent limits of air traffic control, dangerous weather situations, and demand create substantial delays in arrival and departure, while passing traffic is directed around, rather than through, airspace around terminals.[142]

Dynamic density is defined by the "essential factors affecting conflict rate in both the en route and terminal airspace."[143] These factors are: traffic density, a count of the number of aircraft in, or projected to be in, a given volume of airspace; complexity of flow, the controller workload resulting from flows in traffic; and separation standards.[144] It is generally accepted that dynamic density will increase in terminal airspace, especially in the vicinity of hub airports.[145] This is caused by the concentration of traffic in these areas as well as a number of other factors, for example, closely spaced airports, wide performance differences between classes of aircraft, and significant weather in the vicinity of an airport. Reduced horizontal separation standards resulting from a Global Positioning System (GPS) derived position and the capabilities of airborne and ground automation can somewhat offset this trend toward higher dynamic densities.[146]

The task force recommends that the FAA should facilitate the implementation of necessary technology and capability to improve transition to and operation in airspace around terminals, including the ability to handle aircraft arriving on unstructured routes.[147] Additionally, the FAA should encourage the move-

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139 *Id.* at 37.

140 *Id.*

141 *Id.*

142 *Id.*

143 *Id.* at 31.

144 *Id.*

145 *Id.* at 37.

146 *Id.*; *see* discussion *infra* part II.F.

147 TASK FORCE 3 FINAL REPORT, *supra* note 67, at 37.

ment of developed elements of such technologies and capabilities out of research and development, into implementation.[148]

By the turn of the century, Task Force 3 projects that a "universal standard instrument approach concept" will be available at most airports.[149] "Aircraft would arrive from all points of the compass, in a clean configuration, with an optimum-power descent from cruise altitude."[150] The task force sees benefits including less time in terminal areas, which will result in reductions in noise disturbances, fuel burn, and published approaches and charts, while increasing airport capacity and flexibility to accommodate weather situations.[151]

### F. THE TECHNOLOGY

The system currently uses radar to track planes in flight.[152] One problem with the use of radar is that radar cannot always keep track of a plane if it flies behind a mountain or into bad weather.[153] Air traffic controllers, however, know the general location of the aircraft because the plane is following an assigned route.[154] Because of the imprecise nature of radar, air traffic controllers spend much of their time verifying an aircraft's location, speed, altitude, and instructions to pilots, instead of providing an efficient route to pilots.[155]

The cornerstone of free flight is technology,[156] which may require a potential investment of billions of dollars in improved satellites and communications systems to replace the current, inefficient radar-based system.[157] "New equipment will have to be added for pilots and controllers and procedures developed to accommodate both the tightly controlled and flexible aspects of free flight."[158] Advanced technology available now and in the future will provide exceptionally reliable information for users, both on the ground and in the air.[159]

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148 *Id.*
149 *Id.* at 39.
150 *Id.*
151 *Id.*
152 *See* Monica Dias, *Cure Offered for Air Traffic Congestion*, CHI. TRIB., Dec. 10, 1995, at 2.
153 *Id.*
154 *Id.*
155 *Id.*
156 RTCA COMMITTEE REPORT, *supra* note 63, at 9.
157 Howe, *supra* note 27, at 1.
158 Nordwall, *supra* note 94, at 38.
159 RTCA COMMITTEE REPORT, *supra* note 63, at 8.

The use of automation will effectively shift control of air traffic from ground-based radar systems "to computers high over the Earth."[160] New and upgraded equipment will have to be added for pilots and controllers to take advantage of all aspects of free flight.[161] "This technology must be able to identify conflicts and rapidly communicate required actions to the controller and the aircraft."[162] As the industry becomes more technologically equipped, separation standards can be reduced without jeopardizing safety or increasing capacity in the system.[163]

One example of the benefits of such improved technology can be seen in Australia. In a single period in Australian controlled airspace, there were forty-seven reported instances of "separation breakdown" between two or more aircraft.[164] During that same period of time, 168 incidents were reported which involved scheduled and non-scheduled flights. "In ten of the events, traffic-alert and collision avoidance systems (TCAS) on aircraft were credited with a positive role at least in resolving a conflict."[165]

The basic requirements for free flight equipment include precise navigation, reliable communication links, and detection and avoidance of possible collisions.[166] The intended system of free flight revolves around the assumption that a significant number of participating aircraft will be equipped with the navigation and communication technology.[167] FAA officials claim most of the required technology for free flight, such as high-speed data links and satellite communications, is already available, or could be developed without much trouble.[168] The availability of data-linked information (such as textual and graphic display of weather, SUA status, traffic, and airport capacity) in the cockpit would provide more current information on which

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160 Howe, *supra* note 27, at 1.

161 Nordwall, *supra* note 94, at 38.

162 RTCA COMMITTEE REPORT, *supra* note 63, at 8.

163 *Industry Says Free Flight Technology Could Save Airlines Billions a Year*, *supra* note 23, at 152.

164 David Learmount, *The Future's Controller*, FLIGHT INT'L, Oct. 11, 1995, at 20.

165 *Id.* Australian aircraft are not required to be equipped with traffic-alert and collision avoidance systems. *Id.*

166 Michael A. Dornheim, *Equipment Will Not Prevent Free Flight*, AVIATION WK. & SPACE TECH., July 31, 1995, at 44.

167 *See generally* Sweetman, *supra* note 49, at 57.

168 Lunsford, *supra* note 1, at 30A.

to make decisions, and during periods of poor weather, would result in safer and more efficient operations.[169]

The central component of free flight technology is the Global Positioning System (GPS), originally developed by the Department of Defense.[170] Use of the GPS as a navigational aid in aviation became official in February of 1994 when the FAA announced GPS equipment would become part of the National Airspace System.[171] The Global Positioning System allows for the precise tracking of planes through the system's location coordinates that send information to computers on the ground.[172] By using GPS to relay information, instead of relying on ground-based radio signals as aircraft do today, pilots will be able to fly directly from their departure site to their destination.[173] The Federal Aviation Administration has announced plans to develop a network of stations nationwide to receive navigation data from GPS satellites and is intending to spend $475 million on the development.[174]

The automation component on the ground is a conflict probe. The conflict probe is a software package that basically detects any potential contacts between aircraft alert zones.[175] The conflict probe will continue to monitor the aircraft and will project if the intentions of aircraft within its sector will conflict.[176] If the conflict probe projects a possible contact between the protected zones of aircraft, it will propose a course of action which, depending on the controller's assessment, will be given to the aircraft.[177]

Additionally, planes are equipped with Traffic Alert and Collision Avoidance Systems.[178] This system gives pilots warnings when other aircraft fly close by.[179] In fact, this system has been considered standard equipment in aircraft cockpits since the 1980s.[180]

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169 TASK FORCE 3 FINAL REPORT, *supra* note 67, at 38.

170 Dan Palumbo, *Digital Avionics*, AEROSPACE AM., Dec. 1994, at 42.

171 *Id.*

172 *FAA May Let Airlines Set Own Flight Paths*, *supra* note 46, at 1.

173 Chardy, *supra* note 18, at A16.

174 *Id.*

175 Sweetman, *supra* note 49, at 57.

176 *Id.*

177 *Id.*

178 *FAA May Let Airlines Set Own Flight Paths*, *supra* note 46, at 1.

179 *Id.*

180 Chardy, *supra* note 18, at A16.

The drawback to all of this technology is in its expense. This is certainly the concern of general aviation users who fear they will have to add expensive equipment, or else not be entitled to the benefits of free flight.[181] In fact, FAA funding in 1998 does not look good.[182] Specifically, there is no money available for development of data link, the key to free flight.[183]

The intent of free flight, however, is to improve efficiency, thus reducing operators' costs.[184] The Federal Aviation Administration believes the expense should be offset by the savings of free flight, and the RTCA wants to see free flight available to all areas of aviation.[185] However, "no additional restrictions will be imposed on those who choose not to equip their aircraft" for free flight.[186] The FAA and RTCA strongly believe free flight will pay for itself, but for those who do not find benefits in free flight, traditional air traffic control will not disappear.[187]

### G. Implementing Free Flight

As the idea of free flight begins to take root, the FAA will begin implementing a formal plan of transition. The task of implementing free flight nationwide, however, will probably prove to be more difficult politically than technically.[188] The FAA will likely take its direction from the Final Report of Task Force 3.[189] One of the recommendations of the task force was for the FAA to establish a government-industry steering committee within six months of receiving the final report.[190]

However, a general idea of the direction the FAA must take is apparent. Implementation will begin by working with the current system, problems and all.[191] Even though use of new tech-

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181 Bruce D. Nordwall, *Free Flight Could Stall Without Key Data Link*, Aviation Wk. & Space Tech., June 3, 1996, at 28.

182 *Id.*

183 *Id.*

184 CNN Broadcast, *supra* note 10.

185 *Id.*

186 RTCA Committee Report, *supra* note 63, at 5.

187 Bradley, *supra* note 8, at 90.

188 R. Michael Baiada, *ATC System Biggest Drag on Airline Productivity*, Aviation Wk. & Space Tech., July 31, 1995, at 51.

189 *See generally* Task Force 3 Final Report, *supra* note 67 (discussing free flight implementation and safety).

190 *Id.* at 2; *Industry Task Force Report is "First Class"*, *supra* note 70, at 1.

191 Neil Planzer & Margaret T. Jenny, *Managing the Evolution to Free Flight*, J. Air Traffic Control, Mar. 1995, at 18, 20. *See generally* RTCA Committee Report, *supra* note 63, at 13-18; *Free Flight Roadmap* (visited Sept. 22, 1996) <http://asd.orlab.faa.gov/files/ffmap.htm>.

nology is critical to free flight, the real key is in the change in philosophy implementation will require.[192] The aviation industry, particularly air traffic controllers, must move from the concept of controlling air traffic to managing air traffic.[193] The key to managing this philosophical shift and implementing free flight nationwide is to develop a workable structure of development for the FAA to handle different, simultaneous improvements to the current system.[194]

To properly employ the technology of free flight, the FAA will need to specifically define the needs of the system's users and develop procedures to address those needs.[195] At the same time, the FAA will define the technology needed for air traffic managers to provide the users' required services.[196] Before providing the technology, extensive simulation of methods of providing automation, dependent on input from users, will be studied.[197] This evaluation and validation of the requirements of free flight will occur at the same time for the different regions of the changing system.[198] The result will be a model of the specific function and performance specifications of the automation required, as well as guidelines for development.[199]

The first region of implementation will be the area of the Pacific Ocean, between the continental United States and Hawaii, an area called the Central Pacific Oceanic Transition.[200] Implementation will then shift to the mainland, where the FAA will reduce separation standards in domestic en route operations.[201] Finally, development of the new air traffic management system will shift to domestic cruise transitions, then to airport areas.[202]

### H. The National Route Program

One example of the gradual transition to free flight the Federal Aviation Administration is making has been underway in the United States for several years now.[203] The National Route

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192 Bradley, *supra* note 8, at 90.
193 *Id.*
194 Planzer & Jenny, *supra* note 191, at 20.
195 *Id.*
196 *Id.*
197 *Id.*
198 *Id.*
199 *Id.*
200 Bradley, *supra* note 8, at 90.
201 *Id.*
202 *Id.*
203 Nordwall, *supra* note 94, at 39.

Program (NRP) was implemented in late 1990 as part of a joint agency-industry effort.[204] The goal of the program, which has been slowly expanded over the last four years, is to allow more freedom for aircraft in their routing at higher altitudes.[205] Participation, however, has been limited to routes between certain select pairs of cities, with a minimum distance of 1500 miles between cities.[206] The National Route Program allows airlines to pick the most efficient routes between the 104 designated pairs of cities, and file their plans with the FAA.[207]

The biggest steps have been taken since January 1995, when the FAA announced that commercial aircraft at 39,000 feet or above, and more than 200 miles away from their arrival and departure points, could fly any route the airline determined and filed with the FAA.[208] The flight levels were gradually reduced to 35,000 feet east of the Mississippi River and 33,000 feet west of the Mississippi River by the summer of 1995.[209] The FAA announced a moratorium through October 1995 to study the results of this staged enhancement.[210] Jack Ryan, vice president of air traffic management for the Air Transport Association (ATA) reported that up to the moratorium, the ATA had been pleased with the results.[211]

Even with restrictions in place, the FAA believes the National Route Program has been very successful,[212] estimating industry-wide savings at $40 million in 1995.[213] Ryan stated some FAA officials were surprised at the savings, but the airlines claim they have always known there could be large savings in improved management of air traffic control.[214]

The Air Transport Association reports one airline claims that the National Route Program has resulted in savings for that carrier of nearly a quarter of a million dollars over a three-week

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204 *Industry Says Free Flight Technology Could Save Airlines Billions a Year*, *supra* note 23, at 152.

205 Nordwall, *supra* note 94, at 39.

206 *Id.*

207 Linda H. Daschle, FAA Deputy Administrator, *The National Route Program* (visited Oct. 24, 1995) <http://www.orlab.faa.gov/freeflit/FFDaschl.ham>.

208 McGee, *supra* note 9, at 46.

209 *Id.*

210 *Id.*

211 *Id.*

212 Nordwall, *supra* note 94, at 39.

213 Daschle, *supra* note 207.

214 McGee, *supra* note 9, at 46.

period.[215] If that amount is accurate, a projected savings for just one airline could total $3.4 million over a full year.[216] Bill Jeffers, FAA associate administrator for air traffic, stated that the ATA claimed an estimated net savings of about $4.3 million in fuel for 20,000 flights over one year as a result of the NRP.[217] Jeffers also said, "We feel comfortable in saying that the National Route Program has been a success, creating significant fuel and cost savings and reducing flight time in increasingly larger amounts, while maintaining the safety of the passengers in the flying system."[218]

Some observers have suggested the real, hidden value of the National Route Program may appear down the road, as airlines realize the benefits of much more efficient crew utilization.[219] This would result because pilot contracts often require that the pilot be paid based on scheduled flight times, and as airlines are able to take a few minutes off a popular route, there may be additional savings. As the industry focuses on on-time performance, however, the potential savings from labor contracts may be outweighed by the threat of late arrivals.[220]

While the "high-flyers" have recognized the benefits of the National Route Program, the general aviation community has yet to see the economic value of the program.[221] Using the NRP and implementing a fuel-saving program presents an interesting paradox for small carriers.[222] The small carriers may be able to realize the benefits of unrestricted flight, but the cost of research and implementation is daunting.[223]

The National Route Program is not without its critics. Several dispatchers at various airlines allege that many air traffic controllers are not willing to make the effort to make NRP a success, despite the FAA's claims.[224] Those dispatchers claim their proposed routes are routinely rejected by air traffic control centers.[225] One large carrier recently calculated the "savings not

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215 Daschle, *supra* note 207.

216 *Id.*

217 *Industry Says Free Flight Technology Could Save Airlines Billions a Year, supra* note 23, at 152.

218 *Id.*

219 *See* McGee, *supra* note 9, at 46.

220 *Id.*

221 Nordwall, *supra* note 94, at 39.

222 McGee, *supra* note 9, at 46.

223 *Id.*

224 *Id.*

225 *Id.*

realized" due to non-fully-implemented new routes allowed under the NRP and determined that in just one month the airline could have saved an equivalent of almost 500,000 pounds of fuel.[226] The implementation of programs such as the NRP cannot be effective if mandatory compliance of air traffic control is not implemented as well.[227]

Major airlines feel the NRP is long overdue.[228] Giles O'Keefe, chief dispatcher for Northwest Airlines, explains that the program returns asset management to the airlines' control where, he claims, it belongs.[229] O'Keefe analogizes, "If you're driving to work, you don't want the [Department of Transportation] to decide which route you're going to take."[230]

The FAA has plans to further reduce restrictions at the busiest, lower levels of flight.[231] Before a reduction is implemented, each reduction is discussed and negotiated with the National Air Traffic Controllers Association (NATCA).[232] Memorandums of understanding of the new reduction are signed and distributed in each case.[233]

Negotiations with the controllers' union may be in jeopardy, however, because the union is resisting free flight, warning control towers and centers could become overloaded by the new system.[234] As a result, NATCA has refused to participate in development of the National Route Program for the eastern air traffic control centers after radar blackouts and computer failures occurred throughout the summer of 1995.[235] Michael Connor, director of safety and technology for the union, stated their concerns include controller workloads, airspace capacity, and a lack of tools to aid controllers in directing free flight traffic.[236] NATCA claims to have been assured controllers would be provided tools to predict in advance when a sector of airspace would become crowded, while the FAA's analysis of the program

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226 *Id.*

227 *Id.*

228 *See id.*

229 *Id.*

230 *Id.*

231 James Ott, *Airlines, General Aviation Weigh Time/Cost Issues*, AVIATION WK. & SPACE TECH., July 31, 1995, at 41, 42.

232 *Id.*

233 *Id.*

234 David Field, *A Warning from the Control Tower; Policy Letting Pilots Choose Flight Paths Called Unsafe*, WASH. TIMES, Nov. 13, 1995, at A1.

235 *Id.*

236 *Id.*

and computer modeling done for the FAA by the Center for Naval Analysis does not indicate such problems.[237] FAA spokeswoman Sandra Allen says the FAA is surprised by the union's position because the FAA has worked closely with the union in developing the NRP and intends to continue to do so.[238]

## III. THE FREE FLIGHT DEBATE

### A. BENEFITS

The benefits derived from free flight vary, depending on whom you ask. James K. Coyne, president of the National Air Transportation Association, testified before a congressional subcommittee that under free flight, the benefits present themselves in terms of improved safety.[239] Pilots will have access to current and accurate information that is important to safety, while gaining access to that information more quickly, before serious problems arise.[240] Coyne stated the two biggest safety concerns among pilots are bad weather and faltering equipment.[241] Free flight will allow pilots to avoid weather situations and put necessary information in front of them in an emergency, instead of potentially distracting pilots with controllers' communications.[242] Basically, the technology available today allows aircraft operators to not only increase safety, but also to take operational control and flexibility over a flight.[243]

In terms of fuel savings and flight time, some of the most striking savings have been recognized on international routes.[244] Western Airlines reported that relaxing restrictions in such countries as China and the former Soviet Union has literally allowed the airline to chart new territory.[245] In some instances, the airline claimed, as much as two hours in flight time were saved.[246]

The most popular terms of free flight benefits, however, are in the form of numbers—specifically, the amount of money aircraft operators can save by participating in free flight. In theory,

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237 *Id.*
238 *Id.*
239 Coyne testimony, *supra* note 29.
240 *Id.*
241 *Id.*
242 *Id.*
243 Baiada, *supra* note 188, at 51.
244 McGee, *supra* note 9, at 46.
245 *Id.*
246 *Id.*

a free flight system would improve punctuality and cut down flight times by as much as twenty percent.[247] One NASA study estimates an annual savings of $4 billion by 2005.[248] Translated into time savings per passenger, another study has suggested a potential savings of $100 per minute for a planeload of people.[249]

This relates directly to an airlines' savings. As Coyne testified, "[E]ven if the average time saved was only three to five percent per flight, the total saving[s] would be hundreds of millions of dollars per year."[250] As he explained, aircraft expenses are generally considered in terms of "hours flown."[251] The smallest planes expend thirty to forty dollars an hour, while larger planes can run from five to ten thousand dollars an hour.[252] Coyne emphasized free flight will result in significantly reduced travel costs.[253] Furthermore, other than time savings, free flight benefits also encompass savings from more efficient use of fuel.[254]

Computer simulations of a free flight system serve to confirm proponents' expectations. In these models, the new system reduced flight times and improved efficiency.[255] For example, the FAA in one test ran an entire day's operational data (June 14, 1994) through a computer model of free flight.[256] In that simulation, where approximately 45,000 flights operated on optimized routes, the model demonstrated a more even distribution of traffic than the current system, and thus a reduced number of "choke points."[257] There were also a lower number of "proximity events" and flights arrived an average of 110 seconds ahead of schedule.[258]

One study performed by navigation equipment manufacturer Rockwell Collins determined that in 1993 the airlines lost up to

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247 *"Free Flight" for Airliners Proposal Under Study in US*, STRAITS TIMES (Singapore), Oct. 16, 1995, at 4.

248 *"Free Flight" Will End Bottlenecks, Save Time*, COM. APPEAL (Memphis), May 5, 1996, at 7E.

249 *Id.*

250 Coyne testimony, *supra* note 29.

251 *Id.*

252 *Id.*

253 *Id.*

254 Ott, *supra* note 231, at 41.

255 Bradley, *supra* note 8, at 90; *see also* Mike Ball et al., *supra* note 14.

256 Bradley, *supra* note 8, at 90.

257 *Id.*

258 *Id.*

$155 million due to indirect routings.[259] The FAA claims airlines could reduce flight times by twenty percent on many flights.[260] This would result in a potential savings of $5 billion annually by 2010.[261]

Specific estimates for the major airlines vary. Jack Ryan, of Air Transportation Systems, estimates the nation's airlines could save over $1 million a day.[262] Michael Boyd, president of Aviation Research Corporation, sees the monetary benefits of a fully implemented free flight system as saving U.S. carriers $5 billion annually.[263]

Finally, as Coyne testified, a free flight system will make flying easier to learn and more affordable.[264] Coyne sees free flight as encouraging the development of technologically advanced aircraft, thus encouraging employment and industry growth.[265] Ultimately, additional benefits are expected over time as reduced separation standards are accomplished, thus reducing flight time and fuel usage.[266]

### B. Concerns About Free Flight

There are still many people in aviation who have legitimate concerns about free flight. The most common concern is safety, even though supporters of free flight, such as R. Michael Baiada, a United pilot and consultant, believe free flight will actually improve safety in aviation because planes will no longer be funneled into the same few routes.[267] The difficult task that concerns many is what will happen when planes are turned loose from air traffic controllers' constant management.[268] Some who question free flight, such as the primary pilots and air traffic unions, believe there is already an element of chaos in the current system and that the chaos will worsen when that system is removed.[269]

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259 Field, *supra* note 234, at A1.

260 *Id.*

261 *Id.*

262 *ABC World News Tonight* (ABC television broadcast, Sept. 12, 1995) (transcript no. 5182-6).

263 McGee, *supra* note 9, at 46.

264 Coyne testimony, *supra* note 29.

265 *Id.*

266 Ott, *supra* note 231, at 41.

267 *Free-for-All in the Skies*, *supra* note 11, at 22.

268 Lunsford, *supra* note 1, at 30A.

269 *Id.* at 1A.

Andrew Cantwell, president of the Miami chapter of the National Air Traffic Controllers Association, told the *Miami Herald*, "We have serious safety concerns about free flight."[270] He also feels there should be more safeguards to guarantee safety.[271] James Kidd, an air traffic controller at the air traffic control center in Leesburg, Virginia, compared free flight with driving through a parking lot with no rules for the road.[272] Kidd emphasized this scenario will occur at 30,000 feet, "and it's a long way down."[273]

The promise of new technology has generated much of the concern over free flight. In fact, automation advances are the key to mature free flight.[274] The FAA has promised it will not put new designs or systems in place until the agency is sure it can be done safely.[275] As one NATCA representative pointed out, however, no one has considered what happens when the technology breaks down.[276]

Applying new technology to the system will bring up human factors, which must be routinely considered in aviation.[277] This concern applies both to controllers and pilots alike because people can become too dependent on technology, which may affect how people recognize and respond to problems.[278] Some argue too much emphasis is being placed on new technology without properly addressing free flight's effects on human performance.[279] Without doubt, there is still much work to be done in this area.[280]

It has been questioned whether the proficiency of controllers in the new technology will be a problem.[281] Despite this concern, however, the free flight concept implies automation will

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270 Chardy, *supra* note 18, at A16.

271 *Id.*; *see also* Ellen N. Perlmutter, *Pilot-Controlled Flight Plans at Issue*, PITTSBURGH POST-GAZETTE, Sept. 10, 1996, at A-14.

272 NPR Broadcast, *supra* note 42.

273 *Id.*

274 *See* Ward J. Baker, *Free Flight: The Pilot's Perspective*, J. AIR TRAFFIC CONTROL, Apr.-June 1995, at 46 (remarks at the ATCA Symposium on Free Flight, Feb. 22, 1995).

275 CNN Broadcast, *supra* note 10.

276 Perlmutter, *supra* note 271, at A-14.

277 Baker, *supra* note 274, at 46.

278 *Id.*

279 Edward H. Phillips, *Free Flight Poses Multiple Challenges*, AVIATION WK. & SPACE TECH., Mar. 25, 1996, at 27.

280 Baker, *supra* note 274, at 46; *see also* Ott, *supra* note 231, at 42.

281 Baker, *supra* note 274, at 46.

only serve to help controllers do their jobs better, not replace their reasoning process.[282]

As for pilots, the new equipment on planes is considered to be more reliable and helps pilots by relieving them of routing responsibilities that may prevent them from attending to more important matters.[283] Also, advanced automation can keep a plane closer to its intended route than the pilot can.[284] Of course, airlines like the equipment because it cuts costs while increasing safety.[285] United Airlines' head of pilot training William H. Traub feels it is a safer system because there have been no deviations from assigned paths of more than 300 feet since 1982 in the highly automated Boeing 767.[286] In fact, one argument for advanced automation is that each aircraft accident can be traced to human error in some form.[287] Therefore, if the chance for human error is lessened, safety is increased.[288]

However, Dr. Earl L. Weiner, an expert in pilot performance at the University of Miami, has raised the point perhaps everyone is thinking: "What happens when the automation fails? A collision is coming between very inexperienced pilots and very sophisticated aircraft."[289]

Pilots are also the focus of human factors questions. As highly automated planes become more common, researchers are concerned the equipment will be relied on too heavily and pilots will never develop, or may lose, the skills needed in emergency situations.[290] "We're taking more and more of those functions out of human control and giving them to the machines. The question becomes whether humans will really respond when something goes wrong."[291]

Another concern is the complacency and boredom of a plane's crew. This problem is emphasized by a separate study of automation and pilot performance commissioned by the airline

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282 *Id.*

283 Carl H. Lavin, *Automated Planes Raising Concerns*, N.Y. TIMES, Aug. 12, 1989, at 6.

284 *Id.*

285 *Id.*

286 *Id.*

287 Robert J. Andreotti, Comment, *Promoting General Aviation Safety: A Revision of Pilot Negligence Law*, 58 J. AIR L. & COM. 1089, 1093-94 (1993).

288 *Id.*

289 Lavin, *supra* note 283, at 6.

290 *Id.*

291 *Id.* (statement of Dr. Clay Foushee, chief FAA scientist for human performance issues).

industry.[292] Bob Buley, a flight standards manager at Northwest Airlines, stated that if the crew is subordinated to advanced automation, then a certain amount of creativity is lost that may be important in an emergency.[293] Even those proponents of highly automated planes have expressed concern that extensive use of technology raises questions about a pilot's ability to respond quickly in an emergency.[294]

One way this problem is being addressed is by pilot training with simulators. As Dr. Foushee stated, "There have been many simulator advances that hopefully will give pilots training advantages that an older generation of pilots didn't have."[295] The simulators in use today can duplicate any movement a plane might make, and pilots can therefore practice flying the automated plane when different systems go down.[296]

Yet another question raised by free flight is what happens at the airport, when planes come in from different directions and no longer have to wait their turn in line. As John O'Brien, representative of the Air Line Pilots Association, stated, "[T]here's only a certain amount of airplanes that can get into a runway in a given amount of time. Free flight doesn't do anything for that problem."[297] Kidd hypothesized that under free flight, many airplanes could arrive at an airport at the same time, and the controller would be left to "sort out the resulting chaos."[298] As he points out, the planes will eventually have to line up because only one plane can land at a time.[299] At least with the current system, there is no doubt the planes will be in line when they land.[300]

Controllers are specifically concerned with the results of free flight as planes converge on major "hub" terminals.[301] Michael Connor, director of safety and technology for the National Air Traffic Controllers Association, echoed the concerns of Kidd:

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[292] *Id.*

[293] *Id.* (statement of Bob Buley, Northwest Airlines).

[294] *Id.*

[295] *Id.*

[296] *Id.* (statement of Dr. Clay Foushee).

[297] *News: 7:38 a.m. ET* (CNN television broadcast, Mar. 18, 1996) (transcript no. 285-7) (interview with David Hinson, FAA Administrator; John O'Brien, Air Line Pilots Association; and Frederico Pena, Transportation Secretary).

[298] NPR Broadcast, *supra* note 42.

[299] *Id.*

[300] *Id.*

[301] Lunsford, *supra* note 1, at 30A.

"At some point, the planes are going to have to get in line to land, and you're right back to a traffic-jam situation."[302]

When implementing free flight, it must be remembered that all aircraft must be figured into the equation—not just those equipped for free flight—and there will always be wake problems as well as poor weather conditions.[303] This concern is well-founded when you consider that "over seventy percent of commercial jet accidents that result in the loss of an aircraft happen during approach, landing, surface operations, and take-off."[304] When this is considered with such problems as runway incursions and controller error, the impact of these issues is obvious.[305]

The FAA, however, is confident free flight will help, not hinder, the flow of traffic into airports.[306] Free flight will promise that a wave of planes will not simultaneously arrive at an airport, creating a traffic jam of airplanes.[307] The idea of Traffic Flow Management is that all planes destined for the same terminal would send their estimated arrival time for the point where the planes must merge together.[308] The "ground organizer automation" considers all aircraft and replies with an arrival time as close to the desired time as possible.[309] Each plane will arrive at the merge point, even if the planes approach the airport from many different directions.[310]

This system also allows for carriers to determine which planes should be slated for approach first, one of the many complaints raised by the industry.[311] One author has posed the hypothetical situations of six planes operated by the same carrier inbound to an airport and required to hold.[312] Under the new system, the airline will be able to tell controllers which flights are the most important to its schedule and should be allowed to land first.[313]

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302 *Id.*

303 Baker, *supra* note 274, at 47.

304 *Id.*

305 *Id.*

306 *See* Cotton, *supra* note 3, at 12.

307 *See id.*

308 *Id.*

309 *Id.*

310 *Id.*

311 *See* Nordwall, *supra* note 6, at 41.

312 *Id.*

313 *Id.*

Finally, the roles of pilots and controllers in a free flight system is questioned. Defining the varying roles and responsibilities, "especially those of air traffic controllers," will be difficult.[314] The change to free flight will require that responsibility between controllers and pilots be shared, something controllers are not used to.[315]

The responsibilities of air traffic controllers will change from controlling flight to monitoring them and intervening only to prevent problems, although the controller will remain central to a safe system.[316] It has been argued that the controller's job will be more challenging because the controller will have to determine when it is necessary to intervene.[317]

Pilots claim they do not want primary responsibility for maintaining separation standards for aircraft, and controllers do not seem to want to relinquish the responsibility.[318] Some controllers would consider sharing separation responsibility with pilots unthinkable.[319]

Byron Smith, an American Airlines pilot, said that while pilots know free flight has the potential to save the industry a lot of money, he and other pilots are wary of accepting increased responsibility while being required to operate increasingly complicated planes.[320] As Smith explained, "We really don't need something else to keep up with, if it can be avoided."[321] Supporting Smith's claims, the Air Line Pilots Association and the National Air Traffic Controllers Association have stated that shifting the responsibility to pilots will increase the burden of flying complex planes, an already demanding task.[322]

### C. International Considerations

Free flight is interesting to the international community because the concept is at odds with traditional concepts of air traffic control and management practices. The idea of free flight "came as a great shock and surprise," said Brian O'Keefe, the former head of the Future Air Navigation Systems committee at

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314 Nordwall, *supra* note 94, at 38.
315 *Id.*
316 *Id.*
317 *Id.*
318 Malnic, *supra* note 2, at A1.
319 Nordwall, *supra* note 94, at 38.
320 Lunsford, *supra* note 1, at 30A.
321 *Id.*
322 Malnic, *supra* note 2, at A1.

the International Civil Aviation Organization (ICAO), when he presented the concept of free flight at an aviation seminar in Singapore.[323] Asian carriers, including Singapore Airlines, were unfamiliar with the United States plan to research the possibilities of free flight.[324] O'Keefe explained that because fully implemented free flight does not involve aircraft following established routes or even flexible routes at established altitudes, "it is literally a 'foreign concept' to most aviation professionals."[325]

While the United States continues to explore the possibilities of free flight, Europe is taking a more cautious view. The region not only has the world's most crowded and compact air traffic environment, but also the most developed infrastructure on the ground.[326] While Europe does have plans for "augmented satellite navigation," the timescale is less aggressive.[327] By 2005, Global Navigation Satellite System 1, the initial, augmented satellite-based system, will be part of the European system, but the need for ground-based aids through 2015 will be necessary,[328]

In Europe, air traffic specialists do not believe free flight will ever work in such a high-density environment.[329] European ideas focus on improving efficiency and depend on goals such as developing closely parallel routes and reducing separation standards at cruise altitudes.[330] Efforts of the European Civil Aviation Conference (ECAC) and Eurocontrol include rationalizing air traffic management under the European ATC Harmonization Integration Program, or EATCHIP, and looking into questions of congestion.[331] These efforts, rather than free flight, are European priorities.[332]

One advantage the United States has in implementing a system such as free flight is that all of the airspace is under one authority, while in Europe airspace use must be coordinated through many national air traffic control authorities.[333] One

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323 David Hughes, *Free Flight Sparks International Debate*, AVIATION WK. & SPACE TECH., July 31, 1995, at 44.

324 *Id.*

325 *Id.*

326 Kenn O'Toole & Julian Moxon, *FANS Pays Its Way*, FLIGHT INT'L, Oct. 11, 1995, at 23.

327 *Id.*

328 *Id.*

329 Hughes, *supra* note 323, at 44.

330 *Id.*

331 *Id.*

332 *Id.*

333 *Id.*

spokesman for the British Civil Aviation Authority (CAA) suggested free flight would be easier to implement in the United States "because there is so much more airspace available."[334] As one official noted, there is little airspace available to maneuver in, while all of Europe is a terminal area.[335]

The overall human resources job of Eurocontrol is to draw up an "operating manual" to define air traffic control procedures and standards, which every member nation will follow.[336] For example, air traffic controllers in Europe will monitor sectors of airspace by utilizing automatic dependent surveillance (ADS) as well as radar, employ data-link technology to communicate, and will have to monitor and maintain separation between aircraft cleared for en route free flight.[337] How much freedom aircraft are ultimately given in Europe is entirely dependent on the ability to analyze and understand the human capacities of air traffic control.[338]

At meetings in June 1995 of all directors of civil aviation, however, the subject of free flight was not even on the agenda.[339] The route structure in Europe has been described as "a ball of spaghetti" and "a problem of staggering proportions."[340] It will be difficult enough just to prove that parallel routes can be safely implemented in European airspace, let alone free flight.[341] East European airspace may be more adaptable to free flight, but problems in the region include a lack of civil aviation infrastructure to support such operations.[342]

While the primary objective of the RTCA task force was to provide the Federal Aviation Authority Administrator with consensus views regarding the implementation of free flight in the United States national airspace, the broader goal is to produce a seamless global air traffic management capability.[343] In fact, the task force received a major contribution to its study from representatives of Airservices Australia and the Danish Civil Aviation Authority and European Civil Aviation Conference.[344] The rec-

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334 *"Free Flight" for Airliners Proposal Under Study in US*, *supra* note 247, at 4.
335 *Id.*
336 Learmount, *supra* note 164, at 20.
337 *Id.*
338 *See id.*
339 Hughes, *supra* note 323, at 44.
340 *Id.*
341 *Id.*
342 *Id.*
343 TASK FORCE 3 FINAL REPORT, *supra* note 67, at 2.
344 *See id.*

ommendation of those contributors and that of the task force is that substantial international participation in the new Steering Committee, a primary recommendation of the task force to pick up where the group left off, will have a salutary effect on future efforts for developing universal global air traffic management.[345] To that end, the task force recommends that this free flight Steering Committee include appropriate international representatives.[346]

However the United States proceeds, the nation is a significant part of the ICAO North American Region and the FAA needs to keep foreign operators using the National Airspace System up to speed on what the United States is doing.[347] In fact, the FAA should solicit international expertise and be able to answer any concerns foreign operators may have during the development and implementation of free flight.[348]

### D. Questions of Liability

Once the Free Flight system is in place, the question becomes who will be held responsible if something goes wrong. There is much data available about the incidence of accidents involving aircraft and the causes of those accidents.[349] Although there are many causes of serious incidents, the primary cause is pilot negligence.[350] One estimate attributes to human error of the pilot at least eighty percent of all aviation accidents.[351]

#### *1. Pilot Liability*

Currently, according to international convention, it is well accepted that ultimate responsibility for the safe operation of an aircraft lies with the pilot.[352] The Chicago Convention of 1944 states that "[t]he pilot-in-command shall be responsible for the operation and safety of the aeroplane and for the safety of all persons on board, during flight time."[353] Most countries that

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345 *Id.*

346 *Id.*

347 Baker, *supra* note 274, at 47.

348 *Id.*

349 *See, e.g.*, NTSB Annual Review of Accident Data (published annually).

350 Andreotti, *supra* note 287, at 1104.

351 R.I.R. Abeyratne, *Negligence of the Aircraft Commander and Bad Airmanship—New Frontiers*, 12 Air L. 3, 10 (1987).

352 *Id.* at 4.

353 *See* Convention on Int'l Civil Aviation, Dec. 1944, annex 6, 61 Stat. 1180, 15 U.N.T.S. 295.

have ratified the Chicago Convention have adopted this presumption of responsibility, and this is reflected in each country's own air laws.[354]

The United States is no exception. This standard has been adopted as federal regulation which states that "the pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of the aircraft."[355] The federal courts often uphold this legislation strictly, finding that pilots are directly responsible for the safety and well-being of their passengers and aircraft, and are the final authority regarding the operation of their planes.[356] At least one court has held that this continuing duty may require the pilot to scan beyond the normal range of view and manipulate the aircraft to eliminate blind spots caused by the aircraft.[357]

Observers of court decisions regarding pilot liability believe the pilot should always be held absolutely responsible for the safety of his flight.[358] One author suggests this should be the case because the pilot has special training and expertise, as well as sophisticated technology which makes the pilot's job easier.[359] Further, this responsibility includes the absolute authority of the pilot regarding the flight throughout the flight, from take off to landing.[360]

The regulatory system imposed on air traffic and administered by the FAA is relied upon by pilots and controllers alike.[361] This system relies on the assumption that the pilot has total control of the plane, completely understands the minimum established criteria regarding the performance of the aircraft, and at all times knows the speed, altitude, and location of the plane.[362]

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354 *Id.* at 4.

355 Responsibility and Authority of the Pilot in Command, 14 C.F.R. § 91.3 (1996).

356 *See, e.g.*, Moorhead v. Mitsubishi Aircraft Int'l, Inc., 828 F.2d 278 (5th Cir. 1987); Schuler v. United States, 868 F.2d 195, 197 (6th Cir. 1989) (Under visual flight conditions, the pilot has primary responsibility for the safe operation of his aircraft, regardless of clearance from air traffic control.); Rodriquez v. United States, 823 F.2d 735 (3d Cir. 1987) (A pilot who is aware of another aircraft that presents a hazard to his own aircraft has a continuing duty to be continually aware of the other aircraft.).

357 *Rodriquez*, 823 F.2d at 744-45.

358 Abeyratne, *supra* note 351, at 5.

359 *Id.*

360 *Id.*

361 Andrew J. Dilk, *Aviation Tort Litigation Against the United States—Judicial Inroads on the Pilot-in-Command Concept*, 52 J. AIR L. & COM. 797, 803-04 (1987).

362 *Id.*

The rule developed by this system makes sense since the pilot, not air traffic control, is actually in the cockpit and is therefore "in the best position to judge the correct course of action with respect to that aircraft."[363]

Applying this line of reasoning to the impending Free Flight era, it could be argued then, that ultimate responsibility will remain with the pilot. Since pilots using United States airspace were first required to receive federal certification in 1941, advances in technology have not changed or shifted the duties and responsibilities of pilots to comply with Federal Aviation Requirements (FARs).[364] Nor have the expectations of air traffic controllers that pilots will comply with federal regulations have not changed either.[365] While technology has improved the air traffic control system and made it more efficient, it has not changed the pilot-in-command concept.[366] Therefore, improved technology should not shift to air traffic controllers the pilot's burden to fly safely, nor should it cause air traffic control to question a pilot's ability to use and rely on the cockpit's instrumentation.[367]

### 2. *Liability of Air Traffic Control*

Air traffic control is not necessarily left out of litigation regarding aircraft accidents.[368] The question of division of responsibility regarding the safety of a flight is almost inevitable when air traffic control is involved.[369] Much of the case law suggests that the pilot is not always going to be held responsible for an accident.[370] Many federal judicial decisions have held air traffic controllers at least partially liable in accidents involving aircraft,[371] while many courts have completely reversed the roles,

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[363] Andreotti, *supra* note 287, at 1104.

[364] Dilk, *supra* note 361, at 801.

[365] *Id.*

[366] *Id.*

[367] *Id.* at 802.

[368] *E.g.*, Hennessey v. United States, 12 Av. Cas. (CCH) ¶ 17,410 (N.D. Cal. 1971) (finding controllers' negligence regarding a track deviation and failure to warn the pilot was the proximate cause of the ensuing accident); McCullough v. United States, 538 F. Supp. 694 (E.D.N.Y. 1982) (finding the air traffic controllers liable for negligence in not keeping informed regarding poor weather); *see* Hank Gent, Captain, *The Law: The Pilot and the Air Traffic Controller—Division of Responsibilities*, 13 AIR L. 256 (1988).

[369] Gent, *supra* note 368, at 267.

[370] *Id.*

[371] Dilk, *supra* note 361; *e.g.*, Townsend v. Piedmont, 767 F. Supp. 908 (S.D.N.Y. 1986). The court held that the plane was not under the exclusive control of the

giving primary responsibility for aviation accidents to air traffic controllers.[372]

In *Worthington v. United States*,[373] the Eleventh Circuit Court of Appeals found air traffic controllers negligent when a small private plane crashed in a dense fog, killing the pilot and three passengers. The court found that air traffic control failed to provide the pilot with enough information to orient himself with his instruments and surroundings in the fog.[374] Adopting the language of the Second Circuit, the *Worthington* court stated, "[W]e are unable to conclude that the accident was not reasonably foreseeable as a result of the [controllers'] negligent failure to provide up-to-date weather information."[375] The court considered air traffic control the "original wrongdoer whose negligence set in motion the entire chain of events which finally culminated in the tragic crash," and found that "the [controllers'] negligence was ever present."[376]

The courts' willingness to hold controllers liable evidences the fact that an air traffic controller's function under the present system involves some amount of responsibility regarding safe operation of aircraft, and does not serve simply in an advisory capacity.[377] It will be interesting to see if this view of controllers changes as free flight is developed, since the FAA intends for air traffic controllers to take on a more advisory role under that system.

### *3. Manufacturer's Liability*

One final question relates to what extent the manufacturers and designers of the new free flight technology will be parties to

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pilot, and that it was clear that the air traffic controllers had not operated according to their duties prescribed in the Air Traffic Control Manual. The Manual is used as the basis to test the duty of care owed by air traffic control in each particular case. The court concluded neither the pilot nor air traffic control properly executed their respective responsibilities, but that the greater responsibility rested with air traffic control. *Id.*

372 Dilk, *supra* note 361, at 804; *see, e.g.*, Armstrong v. United States, 756 F.2d 1407, 1409 (9th Cir. 1985) ("[C]ontrollers have a duty to warn [pilots] of dangers reasonably apparent to [the controller], even if such duty is not required by regulation, policy or manual because [controllers] have a continuing duty to avoid accidents.").

373 21 F.3d 399 (11th Cir. 1994).

374 *Id.*

375 *Id.* at 407 (quoting Inghman v. Eastern Air Lines, Inc., 373 F.2d 227, 237 n.11 (2d Cir.), *cert. denied*, 389 U.S. 931 (1967)).

376 *Id.*

377 Gent, *supra* note 368, at 264.

suits arising out of accidents where their technology is in the cockpit. It is not a new concept for aircraft parts manufacturers to be brought into litigation where liability of aircraft designers and manufacturers has been at issue.[378] It is likely then, that new technology will expand the existing group of defendants.

## IV. WHAT NEXT? CONCLUDING THOUGHTS AND QUESTIONS

Task Force 3 has a very clear picture of how free flight should work, and how the transition to free flight should progress. Unfortunately, the success or failure of free flight can not be fully realized until free flight is fully implemented some ten to twenty years down the road. During the interim period, problems with the system are likely to arise.

One question that comes to mind is whether or not the driving force behind free flight will continue to push for its full implementation. Sources within the FAA have recently disclosed the fact that "there is an 'overwhelming inertia' against free flight within the FAA."[379] In fact, the FAA did not jump on the free flight bandwagon until after individuals and independent groups presented the issue to Congress. How much of the momentum behind free flight, then, is politically motivated? As in any other government agency, some might question whether the support for free flight will shift with the political winds of change.

There is new concern that politics will force the FAA's plan for implementation to take too long.[380] One of free flight's initial proponents, R. Michael Baiada, believes free flight can be implemented in the next four years for less than $500 million. The FAA's plan requires $800 million only to replace controllers' monitors.[381] The question exists, then, of why should air-

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[378] *See, e.g.*, Shaw v. Grumman Aerospace Corp., 778 F.2d 736 (11th Cir. 1985), *cert. denied*, 487 U.S. 1233 (1988); Monger v. Cessna Aircraft Co., 812 F.2d 402 (8th Cir. 1987); Chohlis v. Cessna Aircraft Co., 760 F.2d 901 (8th Cir. 1985); Moorhead v. Mitsubishi Aircraft Int'l, Inc., 828 F.2d 278 (5th Cir. 1987); Rehler v. Beech Aircraft Corp., 777 F.2d 1072 (5th Cir. 1985).

[379] Karen Walker, *FAA Admits Its Mistake on Funding for AGATE*, FLIGHT INT'L, May 1, 1996.

[380] *A Better, Cheaper Plan for 'Free Flight' Now*, AVIATION WK. & SPACE TECH., Sept. 16, 1996, at 68.

[381] *FAA Strategy on Free Flight Will Take too Long, Study Says*, AVIATION DAILY, Mar. 27, 1996, at 498.

space users be required to fund free flight implementation if there are faster, less expensive possibilities available?[382]

A major voice in the push to free flight is the airline industry. The major airlines have the ability to purchase the necessary equipment while smaller airlines and general aviation may not have the necessary capital. Also, those airlines may not have customer bases that can handle the increased costs to consumers such expenses will demand. It is possible the high "start-up" cost of free flying will deter many from purchasing the technology and will therefore be unable to take advantage of the new system.

Major airlines believe they could recoup the cost from operating savings, but it might prove prohibitively expensive for private pilots to link into the system.[383] Free flight is intended to improve efficiency and, thereby, reduce costs for operators. To the extent that equipping aircraft for operations in the free flight environment costs money, the FAA believes that savings must offset the expenses.[384] The RTCA committee also stipulated that free flight should be available to all segments of aviation.[385]

The concept of free flight is being offered as a solution, and will not be imposed upon the reluctant.[386] Its crafters believe firmly that the benefits of free flight will sell and pay for themselves. For those who can find no benefit, traditional air traffic control is not going away.[387]

Because the cost to airlines could be large, how will these companies meet this expense? Too often in any customer-based industry, increased costs means less customer service. Alternatively, the increased costs to the airline could simply mean increased costs to the consumer.

The nature of technology raises another interesting question. Technology changes and is outdated at a very rapid pace. The FAA has experienced this phenomenon in trying to update antiquated equipment. It is feasible that the technology purchased by the government and by airlines today will be outdated long before free flight is fully implemented. And, if technology changes so quickly, at what pace will the FAA be able to keep up

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382 *A Better, Cheaper Plan for 'Free Flight' Now*, *supra* note 380, at 68.

383 Howe, *supra* note 27, at 1.

384 Bradley, *supra* note 8, at 90.

385 *Id.*

386 *Id.*

387 *Id.*

with replacing and upgrading technology? In an era of budget constraints, it may be unlikely.

Finally, what will be the effect of an aircraft accident when the aircraft involved was "free flying"? As addressed above, there may be tough questions of liability if responsibility for a flight is changing from ground to cockpit. Possibly, lawsuits may have a chilling effect on the desire for free flight. As it stands today, air traffic controllers and pilots alike have expressed legitimate safety concerns. Should the technology be found to be at fault, what effect will this have on the development of such technology? Arguably, development could be stalled and prices could increase significantly.

Unfortunately, these questions cannot be answered until such an incident happens. Overall, air travel in the United States is considered unfailingly safe, and all parties involved will not act without assurance free flight is as safe as the traditional method of air traffic control. If the momentum behind free flight continues at its current pace on the path laid out by Task Force 3, the FAA and the aviation industry will be flying high.

# Articles